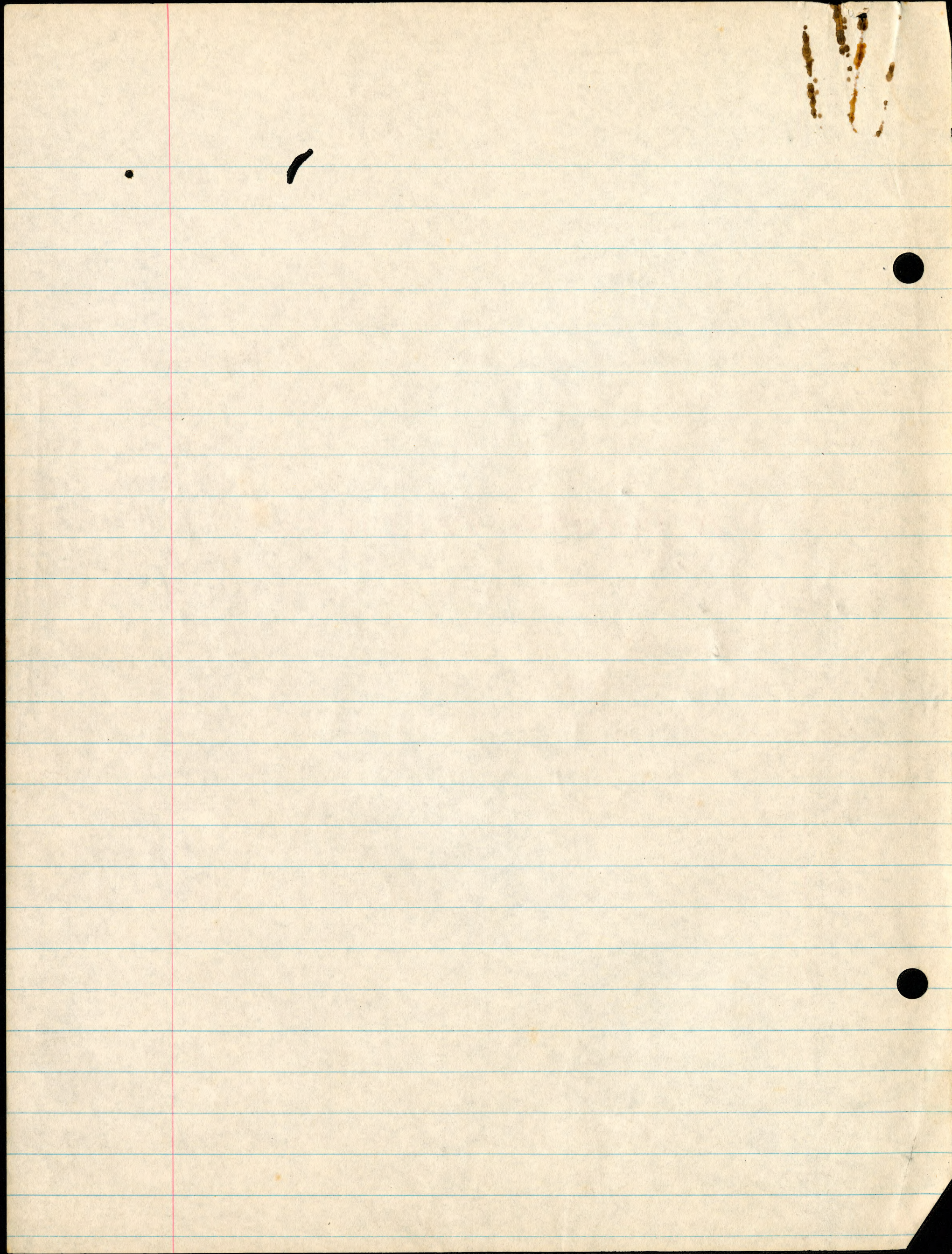


ALOUATTA PALLIATA

I



January 19, 1959
Barro Colorado

I have now got two young howlers here, both apparently ♀. One is very young, with uicisoris (presumably milk), but still pronouncedly silver gray or yellow gray underneath and toward the rear. Presumably just at the beginning of Carpenter's "Infant 2" stage. Something dreadfully wrong with the arm (and possibly the leg) of one side — can't use them at all. I shall call this animal A. The other is much older, at Carpenter's "Infant 3" or, perhaps more probably, "Juvenile 1" stage. Apparently fairly healthy. I shall call this animal C.

The whole behavior of these two animals is quite remarkably Spider Monkey-like (these two also look very much like young black spiders in general shape & mannerisms). The similarity is so close that the relationship cannot be doubted!!! I am perhaps a little surprised by this.

A is very tame and has accepted me as her mother immediately. C is not too awfully shy, but certainly doesn't accept me as a member of the same species at all. I am keeping A with me all the time, or in the cage with the C Titi. The C Howler is down in the large outside cage with the Piche's.

Presumably because she is relatively shy, C has shown much less interesting behavior than A.

C does, however, have a very clear Hdd pattern — just like that of the young spiders. Quite as extreme in physical form although she goes into the Hdd much less frequently than the young

Spiders we had put her on the island (but this may be because she is less shy than they were). So far, of course, she has only had the opportunity to Hdd by herself.

The rest of C's behavior has all been B, with associated and related patterns.

She seems to give her B only when she is annoyed and/or frightened, when I approach her or pick her up. (This is a great contrast with the behavior of A, but it is obviously due to the fact that C has no filial feelings toward me — in fact, she doesn't seem to have any filial feelings at all — she seems to be quite content, and is certainly quite silent, when she is all alone by herself.)

This B is essentially identical with that of the young spiders. Low intensity B, when I pick her up gently or prod her gently for instance, is a rapid series of very short, deep, hoarse, grunting barks: — — — — — Often very long sustained. These barks sound so much like the barks which the L Black Spider gave in long series that I am not sure that I could tell them apart by sound alone. At higher intensities, C's B notes become louder, longer, shriller, & more penetrating, but are still usually uttered in uniform series

— — — — —

There is usually little or no opening & closing of the mouth during either type of B. During low intensity B, the mouth is usually kept absolutely closed throughout, although the lips are usually "blown out" a little with each note, to give a momentary PL effect. During high intensity B, the mouth is usually kept

wide open throughout, without any movement of the jaws at all as far as I can see.

Some B's are accompanied by a definite set pattern. Usually or always the low intensity B's. (Set may be rare or absent during high intensity B's simply because the animal is usually actively engaged in doing something else, like running away, during high intensity B's). This set is sometimes just like the set of the L. Black Spider, i.e. scratching one arm with the hand of the other; but it is more often scratching one cheek or side of the face with the hand of the same side. Usually or always, when set is repeated, the animal scratches first one cheek with the hand from the same side then the other cheek with the hand from that side. Very rarely, the hind foot is used to scratch the side of the head or the body during B, in circumstances which suggest that this may also be a form of "frustration scratching" or set.

A has given a lot more B patterns & related patterns, simply because she always gives B continually whenever she is separated from me (except very late at night, when she eventually falls to sleep after giving B for a very long time). C is apparently still at the absolutely most completely dependent infantile stage (her paralyzed arm may emphasize this), where she is immediately frustrated the moment she loses her grip on her "parent". If she is free to move around when separated from me, she makes constant reaching movements along with her B. Rather surprisingly, the important stimulus which satisfies her filial drive is that of clinging to the parent. She is not happy, for instance, if I hold her tightly in my hand rather than let her hold tightly to my

hand. She gives B when I am just holding her and she is not grasping me.

As far as I can tell, the B's A gives when she is separated from me are identical with those which C gives in hostile circumstances, in spite of the fact that A doesn't show the slightest trace of hostility during her performance. This would indicate that the B of this species, as usual (at least in the case of young animals), is a general frustration reaction. A gives both the high intensity and low intensity types of B when she is separated from me, the high intensity type when she is definitely put away from me, the low intensity type when she is still partly able to cling to me.

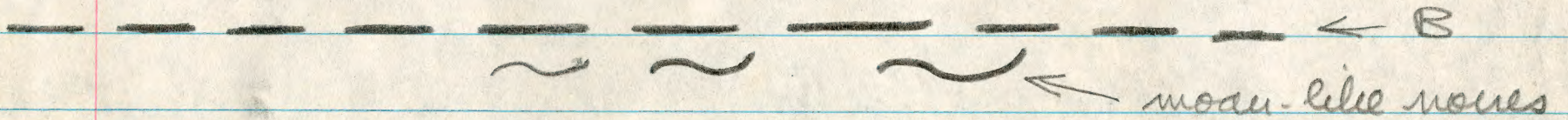
In the case of both animals, in all circumstances, the high intensity and low intensity versions of B are connected by a perfect chain of intermediate B's, so it would not be justified to give distinct names to the two extremes.

It is possible that A also gives all types of B when she is frightened or even both frightened & irritated. She gives bursts of B, for instance, when she falls down from a height (as she does constantly) and when the Jct is bothering her.

It is also possible that some of her initial B directed toward me when I first got her was partly hostile. She showed a slight tendency to back away from me at first when I tried to pick her up, although she always relied it immediately as soon as she was close enough to me to really cling. Some of this early B was accompanied by an occasional scratching movement, of the cheek by the hand, which may have been Jct. But

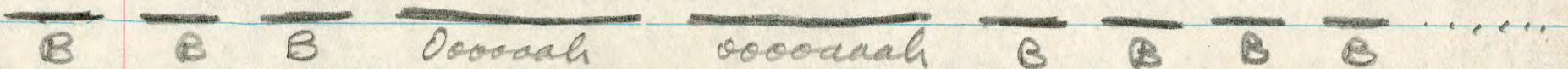
Little or none of her more recent B when separated from me has been accompanied by any scratching of any sort. This would suggest that the Sct may be really hostile, the direct result of hostility in a way that the B itself never is.

There is a peculiar sound associated with the B's of A which I find rather difficult to decipher. Plaintive moan-like notes, many of which might be transcribed as "Oooooah". Uttered exactly at the same time as B Notes (of all intensities, I think - or at least a variety of intensities), but not always synchronized exactly with each B Note. What I mean by this last peculiar statement may be illustrated by the following diagram:



I think I shall call these noises "MB". They are rather reminiscent of the M of the Night Monkeys, but I am not sure that they are strictly homologous with the latter. A apparently only gives MB with B Notes which are obviously the result of frustrated filial motivation. Thus it is possible that the MB is not a general frustration pattern.

Once this morning, A did a lot of B-ing when it was separated from me in which "Oooooaaah" Notes took the place of some B Notes instead of accompanying B Notes. These "Oooooaaah" Notes almost seemed to be the culmination of the B series. A typical performance might be represented comme ça: $\frac{\text{---}}{\sum} \quad \frac{\text{---}}{\text{B}} \quad \frac{\text{---}}{\text{B}}$



It is my impression that these "Ooocaaah" Notes were less plain.

two sounding than the MB actually combined with B, and I don't know exactly how they are related to "typical" MB.

At very low intensities of frustration, A may utter only one or two low intensity B Notes in a "series" sometimes, in the same circumstances (perhaps at even lower intensities ??), these single or very short series of notes become high pitched and squeaky instead of deep & grunting. Such notes may well be strictly homologous with the Squ of Atelles & Cebus, but they are certainly very much rarer than the Squ Notes of any of the species of the other two genera I have watched. I think that A has only given these "Squ" Notes when she was just a little bit uncomfortable in my hand.

It is also possible that A has a Fill (S Fill) pattern of some sort. She has occasionally given single notes which sound like the high pitched S Fill's of Cebus, Lagothrix, and Atelles. Usually in my hand. There may really be Fill's of some kind, but I rather think that they are just intermediate notes between B or "Squ" and Mu (see below). The only thing which might make me think that these Fill-like notes might really be a separate distinct pattern is that A once gave a relatively loud Fill-like note when it was startled by someone hammering nearby.

It is obvious, in general, that the main part of the vocal repertoire of this species is much like those of Cebus, Lagothrix, and Atelles, except that the B patterns are greatly hypertrophied, while the homologues of Squ and the Fill are very little developed or absent. The repertoire of this species must thus be considered typically platyrrhine.

A does have a Mu pattern like other species. A soft, rather rattling or vibratory murmur, which sounds almost exactly like that of the Fiti. This is obviously the "purr" of Carpenter. It is just the sort of thing which is often called a contentment note, i.e. the very slightest distress reaction. A gives it, for instance, when she is happily asleep in my lap and I touch her just enough to disturb her the very slightest bit.

A's Mu is quite frequently accompanied by "chewing," again just like that of the Fiti.

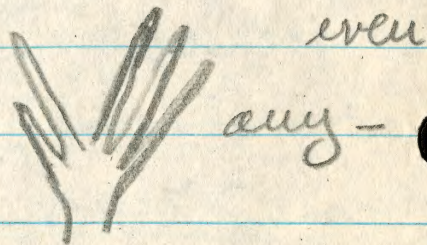
Sometimes, when I put A in the cage, after she has given moderate to high intensity B Notes for a long long while, the frequency and intensity of her B Notes gradually declines, and she begins to utter them in fairly discrete 3-, 4-, and 5-note series. I think the 3-note series are the most common, or, at least, the "basic" pattern (i.e. the 4 and 5-note series sound like the 3-note series with just a little bit extra added on). The pitch of the notes in a 3-note series is often quite characteristic.

I wonder if this pattern could be the "distress call" of Carpenter? In any case, I don't think I should give it a separate name yet. All the notes in these 3-, 4-, and 5-note series are obviously just ordinary B Notes. This seems to be just an ordinary "exhausted" rather low intensity B pattern. (It is interesting that I have never heard A utter these 3-, 4-, and 5-note series when she is working herself up at the beginning of long series of B. This may be significant.)

Surprisingly enough, A and C have quite ignored both the sound and sight of one another, even when one or both is uttering

long and loud B. The only possible exception was this afternoon. I was sitting outside the big cage in which C was roaming around, and A was sitting quietly and half asleep in my lap. Then, three times, when C was walking quite close to us, A uttered a single loud explosive-sounding bark-like note. Sometimes completely monosyllabic, and perhaps could be transcribed as "Hoh!" Sometimes almost bisyllabic, like an inspiration and expiration of breath, and perhaps could be transcribed as "Oh-hoh." Something about this performance made me think that it might be a sort of "Alarm B"!

The hands of these two animals are really quite peculiar. The division between the fingers is, of course, 2-3, but the division is much more conspicuous morphologically than I expected. Much greater than in Aotus, Callicebus, or any of the marmosets or tamarins I have observed. (I think that Lagothrix may be intermediate between these other monkeys and the Howler in this respect. My notes would imply that the Woolly always divides its fingers 2-3, if it divides them at all, but I don't remember any morphological differentiation.) These two Howlers, however, often spread the fingers wide even when they are making no attempt to grasp anything!!



When C walks along the ground he usually holds his arms (not his legs) "abimbo" in a most Spider Monkey-like manner.

Both A and C have occasionally showed signs of trying to clean their faces, after feeding, by rubbing the muzzle along a

hard surface or a branch; but such attempts are always very rare, slight, and ineffective. Their usual method of cleaning the face is to brush across it with a single swipe of a hand. This may also be another resemblance to Lagothrix.

Now I have heard A start to do a little more low intensity B, and I can describe it a little better. The lowest intensity pattern of the "B complex" seems to consist of notes which sound like "whispered" ordinary B's, with a pronounced "Tsh" quality (I shall call these "Tsh" from now on). Then, at what seems to be slightly higher intensity motivation (or rather frustration of motivation) the Tsh's are replaced by Squ's. There does seem to be a real S-Hill pattern in this species, and it seems to occur at just slightly higher intensities than the Squ. The S-Hill's are rather low-pitched without being wooden-sounding. They are just about the same pitch as the real low-intensity B's, and they sound very much as if they were the lowest intensity of the actual barks. I can certainly confirm that all the "sub-B" patterns, i.e. Tsh, Squ, and S-Hill, are relatively very rare in this species, and the S-Hill is the rarest of the lot.

Alouatta palliata, I

January 22, 1959

Barro Colorado

I have now got a third Howler, which I shall call D. It seems to be a female, but its genitalia are rather different from those of A and C. D has nothing at all like a penis or clitoris, but A and C do have a little something which I have been interpreting as a clitoris.

Does this mean A and C are males? I think quite possibly yes.

I have seen a little more behavior recently, which may have clarified a few points, and added a little more information, but nothing very spectacular.

The Trh, Squ, and S Trill patterns are still only uttered by A. Neither C nor D has shown a trace of them. And I have seen C start B "apparently from nothing." This process was as follows. C was first sitting quite silently, then began to utter a series of faint notes, so faint that I could hardly hear them at all, but apparently quite similar to the grunting barks (which I called "low-intensity B" on Jan 19) in tonal quality. These faint notes gradually became louder & louder until C was giving full-scale loud grunting barks. This performance thus seemed to include all intensities of B except the very highest. The fact that no Trh, Squ, or S Trill Notes were uttered at any time during this performance would suggest that the Trh's, Squ's, and S Trill's of A must be qualitatively as well as quantitatively different from its B patterns (Perhaps the Trh, Squ, and/or S Trill contain some filial motivation ???) It must be remembered, however, that A is much younger than C or D, and some of the differences in its behavior may be due to its age.

D seems to be a tufle younger than C. It is much more heavily built, and much fatter than C, but a tufle shorter. It seems to be completely lacking its lower front incisors, which would suggest that it is at the beginning of Carpenter's "Infant 3" stage.

D's behavior is much like that of C. It is a little tamer than C, but it still doesn't like to be picked up, and tends to retreat before me when I approach.

D's B patterns seem to be quite like those of C. D does not utter B when it is by itself alone, i.e. it has passed the stage of filial dependence. It seems to utter B only when annoyed or irritated.

I have also heard D utter MB Notes quite like those of A when it was sitting on my lap, which it quite dislikes. This would seem to indicate that the MB is not produced by, or really connected with, filial motivation.

C has occasionally made loud "Hoh" or "Oh-hoh" Notes while walking more or less peacefully around its cage. These are absolutely identical with the notes that I called "Alarm B" when they were given by A (Jan. 17, p. 8); but C showed no sign of alarm when it gave these notes. This would suggest that such notes are perhaps nothing more than brief moderate-intensity "ordinary" B responses to a sudden (& transient?) stimulus.

D does not quite like C.

I have also seen D do "chewing" when it was sitting on my shoulder, and also when sitting in my lap. Once it seemed to have regurgitated some apple I had given it a few minutes before and was chewing that. Don't tell me this "chewing" is really chewing the cud?

A still does all or most of its B when it is separated from me, often when frantically trying to climb up and cling to me; but some of this B, particularly the highest intensity most frantic type when it is clinging to me, is definitely accompanied by biting movements. (It will bite my arm at exactly the same place it is trying to cling to.) This would suggest that even at this early stage, frantic

reaction is beginning to lead to hostility (even, perhaps, just plain attack).

Several times, when I have started to pick A up, it has responded by suddenly pumping its (pink) tongue in and out several times. I think C also did this once, the night it arrived, while it was sitting in Hdd, when I approached it. This might well be hostile. I wonder if it is related to the tongue-pumping before copulations described by Carpenter ???

When A does "chewing" on my arm or shoulder, this is usually accompanied by "muzzling" or licking or very gentle chewing of my flesh. I wonder if this complex of patterns can be related to suckling?

All these animals have a strong tendency to climb upward at times of stress. This is certainly true of C and D when they are frightened and trying to escape. It is also true of A when it is trying to cling to me or approach me. It will even climb up the side of its cage when it sees me and wants to come to me, even though this climbing leads it away from the door which leads to me.

A has a very strong tendency to get as close to my face as possible. This is true even when I am lying down, i.e. when my head is not the highest point of me.

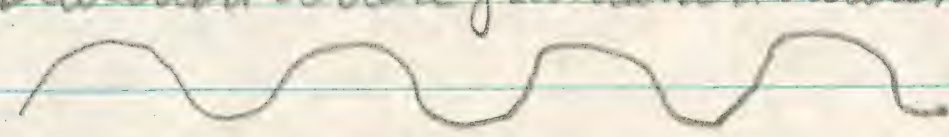
The only stimulus that can ever cause A to move away from me is heat. When it is cold it will even leave my shoulder to go a few feet away and lie under a warm lamp. Then, when it gets warm, it tries to come back to me.

I think the set of this species must be a rather low-intensity.

its pattern on the whole. Both C and D tend to do Sct (of the cheer
hs) with very soft low-intensity B, or after a burst of louder B.

I have now been watching A's reaction to heat a little
bit more. The light he goes to is on my desk, and when it leaves my
shoulder to go under the light, it is perfectly happy to lie there as
long as I remain near the desk a few feet away. Just lies half asleep,
or even completely asleep, quite silent. But as soon as I leave to go to
the other room, it immediately sits up, and starts to give 3-, 4-, or
5-note calls like those described on Jan. 17, p. 7. I shall call them
"Abandonment Notes" ("Ab-"). Tonight A gave relatively few
4- or 5-note Ab's. Most 3-note — — or, quite com-
monly, — — It also gave a number of what appear-
ed to be low-intensity 1-note or 2-note Ab's. or

— The latter were almost as common as the 3-note series.
While A gave these Ab's, it showed intention movements or weak
movements of reaching for me, but it was reluctant to leave the
heat. It's Ab notes finally stopped after about 1/2 hour.

Some of its Ab was occasionally interrupted by brief bursts
of the grunting bark type of low-intensity B. It is obvious that the
Ab is closely related to B, but I think that it may well be qualitatively
distinct in some ways. (If it is just an intensity variant of B,
then the motivation where frustration causes the Ab is probably fluctuating
 very rapidly.)

In general, A is showing a tendency to stop its B and other
notes more rapidly when I abandon it now. This is probably condition-
ing

(14)

Alouatta palliata, I

January 26, 1959
Barro Colorado

More about the "tongue pumping" of A. I shall call this pattern "TP". It did a violent burst of TP (tongue going in and out quite fast) yesterday when I was carrying it in the generator house, when the generator was started. Obviously frightened I think. The TP was followed by long B. It has also done a little TP from time to time when I start to pick it up in my hand. The lowest intensity form of TP seems to be a simple protrusion of the tongue, for a few seconds, without any in and out movements.

I put A in the big cage with C and D today, for a little while, to see what would happen. Both C and D seemed mildly interested at first. They came down from their perches, followed A (who was trying to get to me, of course), and eventually came up to sniff at A. Sniffed at both A's face and rear. No rigid nose to tail performance like the Perico's, I only because A didn't seem to do any sniffing back.

When D came up to sniff A, I think she uttered some soft liquid plaintive sounding notes, with mouth closed. Later on, she sat beside A and uttered a series of short, nasal, slightly reedy or trilling "Aauh" notes, opening & closing the mouth conspicuously each time. I have no idea what either of these notes might mean.

A seems to be uttering relatively more Ish Notes, and relatively few B Notes, now, in the cage in my home and in general when I am handling it. A sign of generally lower intensity?? Some of these Ish Notes are very hard-sounding, almost like "Tschuck".

Alouatta palliata, IJanuary 28, 1959
Barro Colorado

We found that D had worms today, so we took both C and D out of their big cage and put them in separate ones. C was put in one of the small outside cages. Shortly after it was put there, a wild band of Howlers showed up on the other side of the clearing, where C could hear them from time to time. I don't know whether it was the sudden separation from its companion, or the appearance of the band, but C suddenly became quite vocal for an hour or so. Giving short series of loud long hoarse barks. Lower in pitch, hoarser, less shrill than the notes I have called high intensity B before, but quite urgent, high intensity, sounding actually, these notes sounded quite like the BB of the White-faced Capuchin in quality. Some at least of these series by C were like this: This is quite like some of the ab's of A; and I think that these calls may well have been "older" versions of the ab.

Alouatta palliata, IFebruary 20, 1959
Barro Colorado

A's behavior has been just about the same for the last two weeks. I think that I have a fairly good idea of its vocal repertoire now. (We recorded most of its vocabulary yesterday. I misidentified the date on the record, saying February 18th instead of February 17th.) The main elements of A's present repertoire seem to be as follows:

B (including Ab)

Waa ("Waaaah Notes")

MB (or M)

Mu

The B's are still the most widespread notes, in the sense that they occur in the widest variety of circumstances. The actual sound of A's B's at the present time is much the same as before, insofar as they range from low-intensity "grunting" types to more high-pitched, urgent-sounding high intensity types. A still seems to perform B as a "general frustration reaction." It gives B alone when I pick it up by its tail or manhandle it in any way. The number of B notes, and the type of B notes, in such circumstances, seems to be directly dependent upon the strength of the unpleasant, painful, stimulus.

A also gives B when I abandon it, when I am relatively far away from it and/or definitely moving actually away from it. Some of this B seems to be quite identical with the B it utters when I hit it or hold it by its tail or make it physically uncomfortable in any way. Including both low-intensity grunting types and higher pitched high intensity types. As noted above, this B is usually long sustained & nearly continuous at first, but then showing a tendency to break up into "Ab" as the animal becomes "exhausted." I have now decided that Ab is only a slight variant of ordinary B. It is extremely variable. In the recording yesterday, I called it the "3-note call", but it may vary from a long series of 7 or 8 notes or more to only 2 (probably only 1, but this would be difficult to identify as such). The only distinctive feature of the "Ab" type of B is that it consists of a series of notes, the middle notes of which (or the end notes, in the case of a 2-note series

and some 3-note series) become suddenly much louder and higher pitched than the others. This may vary from something like this:

— — — — — to this —

I presume that these fluctuations must really be due to some sort of fluctuations in the internal frustration.

This B as a result of abandonment is not easily suppressed by the absence of any response to it. A will continue doing B almost steadily throughout a whole day when I am away in tone (although it usually stops, pretty much, by the second day, when I am away for two days).

The B as a result of abandonment is never uttered alone. It is always accompanied by some of what I called "MB" earlier on. Plaintive "Ooooooh" sounds. These tend to occur after particularly high intensity B notes (during "ordinary" B or in "ab"), but are probably not absolutely confined to this situation. They are obviously the result of frustrated gregariousness or filial motivation, as they only occur in abandonment situations. I am now sure that they are strictly homologous with the M of the Night Monkey.

One of the component notes of A at the present time, and for some time past, is the Waa. This must have segregated out from some form of low intensity B, but it all happened before I actually noticed it. The Waa is another abandonment pattern, and is often associated with B and M; but it is characteristically uttered when A is quite near me, and can't get up onto my neck or shoulder, although I am not actually moving away. It doesn't seem to be so much a low intensity abandonment pattern as a short-range one. It is difficult to

describe very well, but it might be transcribed as a hoarse, moderately low-pitched "Waaaaah" Note. Waa's may be uttered singly or in series, but the series are never organized into a distinctive type like the "ab" type of B. The typical Waa Note might be said to have a slightly "creaky" "vibratory" quality mmmmmm. This is never anything like as distinct as the MMMM of the Gill patterns of other species, but I wouldn't be surprised if it were largely or completely homologous with some (at least) of the Gill's of such species as the Woolly Monkey. At very high intensities, the Waas become very loud and high pitched, sort of "Whining screams". This tends to occur when I start to move out of the room in which A is, before it begins to utter B's and M's.

It is possible that some of the Waa Notes of A are followed directly by M, without any intervening B, but I am not sure about this. Such cases must be at least very rare.

Today I put A in the big outside cage with C and D again. C reacted in the usual way, coming up to sniff at A's rear, and then started to run away from A, and then running back to leap on A, doing this repeatedly, in an apparent attempt at "play". During this "play" it uttered a lot of very soft short "Ooh" or "Uhh" Notes, occasionally interrupted by a single quite definite and separate M Note. These "Ooh" Notes may have been nothing but regular low intensity B Notes, but they did seem to have a definitely if slightly greater vibratory quality, and I thought that they might be the "adolescent" version of the Waa.

The Mu Notes seem to intergrade almost perfectly with the Waa Notes. They might almost be considered just slightly differentiated low

intensity versions of the Waa.

I don't think A has any other really distinct calls. I haven't heard anything like distinct "Tsk" for some time now. Sometimes, at the beginning or end of a burst of B Notes (or even Waa Notes), it may utter one or a few more notes which sound like the Sg of other species, but these are obviously just low intensity versions of the other notes, and not a separate category in themselves. Sometimes, during low intensity Waa, A utters a sound which is much more reminiscent of the real Tsk's of other species than the usual "Waa", but these notes seem to be almost "accidental" in the circumstances.

I was interested to note that A completely ignored the sound of its own voice on the tape recorder. A very great contrast with the behavior of young Spider Monkeys in the same circumstances.

This lack of "social reactivity" is manifested in other ways. A completely ignores C and D when it is in the same cage with them. And C and D usually ignore A after their initial investigation of its anal or genital region. And all three animals seem to completely ignore the wild Howlers (a large band has spent most of the last week in the trees above the cage in which the captives are). The wild Howlers also seem to ignore the captives, at least most of the time. (They once came close & howled when I was giving C medicine and it was doing a lot of B - but they also tend to come close & howl when I am not touching a captive and the captives are silent.) I can understand why the wild animals might ignore the captives, as the captives are all young; but the lack of any reaction by the captives is quite surprising.

The captive howlers always seem to clean their ears after

defecation by rubbing along branches or the ground.

A's paralyzed arm & leg are much better now, but it still weighs only 500 grams, so it probably isn't doing too awfully well.

Alouatta palliata, I

February 26, 1959

Barro Colorado

I have gradually been breaking A of its dependence on me.

First, I started putting it in the outside cage with all the other howlers from time to time, approximately every other day for half a day or so. This didn't work at all. A spent all its time in the cage giving frantic ab-type B — and also developed dreadful diarrhoea, I think probably psychosomatic. (A developed diarrhoea on at least 3 separate occasions after being put in the outside cage.)

Then, I put it in the outside cage every day all day. This seems to be working a little better. The decline of its reaction to me has been interesting.

It spent the first day in the outside cage giving the ab-type B all the time I wasn't in sight, changing to Waa whenever I was in sight. The Waa becoming particularly high & shrill & plaintive whenever I started to leave. All the Waa (and probably the B) accompanied by frantic attempts to get to me.

The next day it did little or no B while I was out of sight, but always did lots of Waa, and made frantic attempts to get to me, whenever I was in sight.

On both days, it always did Mu when I picked it up.

The third day was today. It hasn't given B when I was away.

today either. Whenever I come in sight today, it still gives Waa, but when I don't respond it eventually falls silent and tends to wander away & feed disconsolately. Its diarrhoea has stopped. When it does give Waa now, it still tries to get to me, but even this is much less vigorous than before. It still gives Mu, however, whenever I pick it up.

When it still gave the Ab-type B, this was accompanied by M in the usual way, but I think that the M dropped out some time before the B was completely finished.

This is certainly a fine case of the decline of a "drive", or the overt expression of internal factors, by negative conditioning alone. It is obvious that A's internal "filial" drive is as high as ever, and it could revert to its earlier type behavior with just the slightest bit of encouragement. Even now, for instance, whenever I pick it up (to get it out of the doorway, for example) and put it down again immediately, it shows a brief recrudescence of (Ab)B-M just after being put down.

Surprisingly enough, perhaps, A still doesn't seem to show the slightest positive reaction to any of the other howlers.

While A was still being vocal, I noticed a few more things about its calls. I wouldn't be surprised if the "Fil" type notes (which I heard again a few days ago) were the lowest intensity form of Waa. At least, they intergrade with Waa. I still think that the "Equ" type notes may be the lowest intensity form (or one of the lowest intensity forms) of B. Several times, a couple of days ago, A uttered several notes which seemed to be nearly identical with the S Fil's of other species. These were associated with Waa Notes, and I think that they were really moderately low-intensity Waa Notes of the shrill plaintive type. In any case, such

performances would seem to be additional evidence that the Waa of the Howlers is homologous with the Ill's of other species.

I have got a new Howler, probably ♀, younger than D. I shall call it X.

When I first got X, I put it in a cage by itself. Whereupon it did lots of Ab-type B for an hour or so before shutting up. Did ordinary B when handled. Later on, I put X in the small cage in which A and the young Titi were at the time; and it again did ab-type B for about an hour, apparently completely ignoring A and the Titi. Still later, I put in the large cage with the other Howlers, whereupon it settled down without any B.

The response of both C and D to the first appearance of X was just as expected. Both C and D repeatedly came up to X and nipped at its rear. D also nipped at X's face later on. X did a little nuzzling of C's & D's rears, but relatively very little.

It is becoming more & more obvious that Howlers usually clean the anal region after defecation by rubbing, but they do not do this more frequently when they are excited (if they don't defecate) than at other times. This rubbing certainly does not seem to be a social signal.

I have noticed that when D runs away from me in the cage (I give her a little medicine from time to time as treatment for a skin disease) she utters very soft (and rather rapid) B. This seems to be very low intensity as she is not greatly frightened of me. The interesting thing is that these low intensity B's are quite gulping in sound, really quite reminiscent of the Gp's of the Night Monkey.

C is by far the most playful of the Howlers I have now. Presumably just the right age.

As far as I can tell, these animals have no scream pattern. They just seem to do B when I handle them.

I think that there may be qualitative as well as a quantitative difference between the shrill whistle-like trill-like Waa Notes and the ordinary deeper, more rasping, Waas. At least, A can give long series of the deeper type of Waas, apparently rather high intensity, as well as brief single whistle-like Waas, apparently rather low intensity. The more whistle-like type may contain a relatively stronger "filial" component, and relatively less hostility (?? less hostility as a result of frustration ???). The whistle-like notes, which are also very plaintive and "whining" may also be transitional to M.

Alouatta palliata, I

March 27, 1959
Barro Colorado

Unfortunately A ("Edna") died early this month, while I was away in Chiriqui. But I now have another new Howler. I shall call it "Y" Younger than X (just about exactly intermediate between X and A, I should think. Possibly 7??? Two days ago, it weighed just about 700 grams.

Y is not very tame, but is partly fixated on me. I have heard it give all the calls that A gave, except M & Mu (it doesn't seem to be tame enough for the latter). The interesting thing, however, is that it gives some of these calls in rather different circumstances, at least sometimes.

I am now convinced that the Waa is a generalized distress call. Low to moderate intensity. Y sometimes gives this call just

after I have put it in its cage (it is always kept in a cage by itself), just as A did. But Y also gives the Waa in other circumstances, when it seems to be uncomfortable for one reason or another. When I sent get Y in the market, I brought it back to the office in a box in the jeep. It was generally silent during this trip, but every time the jeep went around a curve, and Y was jimmied against the side of the box, it uttered one or more Waa Notes! It also utters Waa Notes quite frequently when I hold it in my hands and mishandle it a little. And it always gives some Waa Notes, sometimes many of them, when I give it a bath, which it simply detests! In both the latter circumstances, the Waas may sound exactly like the Waas A used to give when abandoned, but they are often somewhat more regular, uttered in a burst of notes of irregularly varying loudness & length, and they frequently intergrade with ordinary hostile B (see below). In other words, in the latter two situations, Y is both distressed and annoyed, and either one of these two sentiments may predominate at different times. Sometimes, when Y has been giving quite a lot of Waa Notes in my hands, and then gradually calms down, it may give one or two very squeak-like notes, quite plaintive in tone. These sound rather as if they were the lowest intensity form of Waa. More important, when Y is giving both Waa Notes & ordinary B, it sometimes utters peculiar Waas which have a distinct quaver or "rattle undertone". These are very reminiscent of the more wooden-sounding trills of such species as the Woolly Monkey. Another indication that the Waa may be strictly homologous with the S-Hll of the Woolly (It may also be an indication that the S-Hll of the Woolly is a generalized distress call.)

I also think that the "ab-type" B may be another distress

call, or, at least, contain distinct elements. I brought Y out on the tra-
in in a paper bag, and it selected this. Constantly vocal in the bag,
and all or most of its vocalizations were ab-type B, or something very
similar. Some of these vocalizations were probably quite "typical" ab,
just like A used to give when abandoned, but others were a little dif-
ferent. Not organized into definite, "structured" series. But most of these
notes were definitely longer than the usual purely hostile exclusive B,
and not organized into series comme ça: — — — — —

Y's purely hostile B seems to be identical with that of A and all
the other Howlers I have had.

We tried recording Y's Waa Notes today. Before doing so, we
played back the old recording of A's notes. Y reacted to the sound
of A's voice immediately, but in a rather unexpected way. It
immediately ran frantically around the room (not going near the re-
corder) in what was obviously escape behavior. Then it repeatedly
tried to climb up some electric pipe on the wall. I stopped it from
doing this, and then it went to a dark corner of my book case,
got behind a pile of books, and moved about nervously (within a
very small radius) and/or sat hunched up in it all these. In other
words, it was scared stiff by A's voice. This behavior started
when we played A's hostile B (the first sounds on the record-
ing), stopped when we played a very bad recording of Mu, then
started again when more hostile B came on, and, rather surpris-
ingly, continued throughout all the rest of the recording, even when
A was giving ab-type B, and/or Waa's, in addition to, or inst-
ead of hostile B! Perhaps the most interesting aspect of this whole

performance, however, was the fact that Y was quite silent throughout.

Like the other Howlers I have had, Y always or usually becomes very aggressive whenever its "clinging" filial motivation is thwarted. When it is clinging to my arm, for instance, and wants to climb up on to my head (its favorite spot) and I prevent it by grasping the tip of its tail, it immediately starts to hate me, gives hostile B, and even jumps up and down like a wild Howler on a limb! (What effect such behavior must have on its mother in the wild I can hardly imagine!)

There would thus appear to be a peculiar relationship between the reactions of young Howlers to the thwarting of their desire to cling to their mothers' hair. When the mother is distant, or at least unapproachable, the young do ab-type B and Waa's without overt aggressiveness (or overt escape, for that matter), usually with searching or approach movements. When they are in contact with the "mother", but "she" prevents them from going to the spot they want, they resort to open aggressiveness & hostile B, without ab-type B or Waa's.

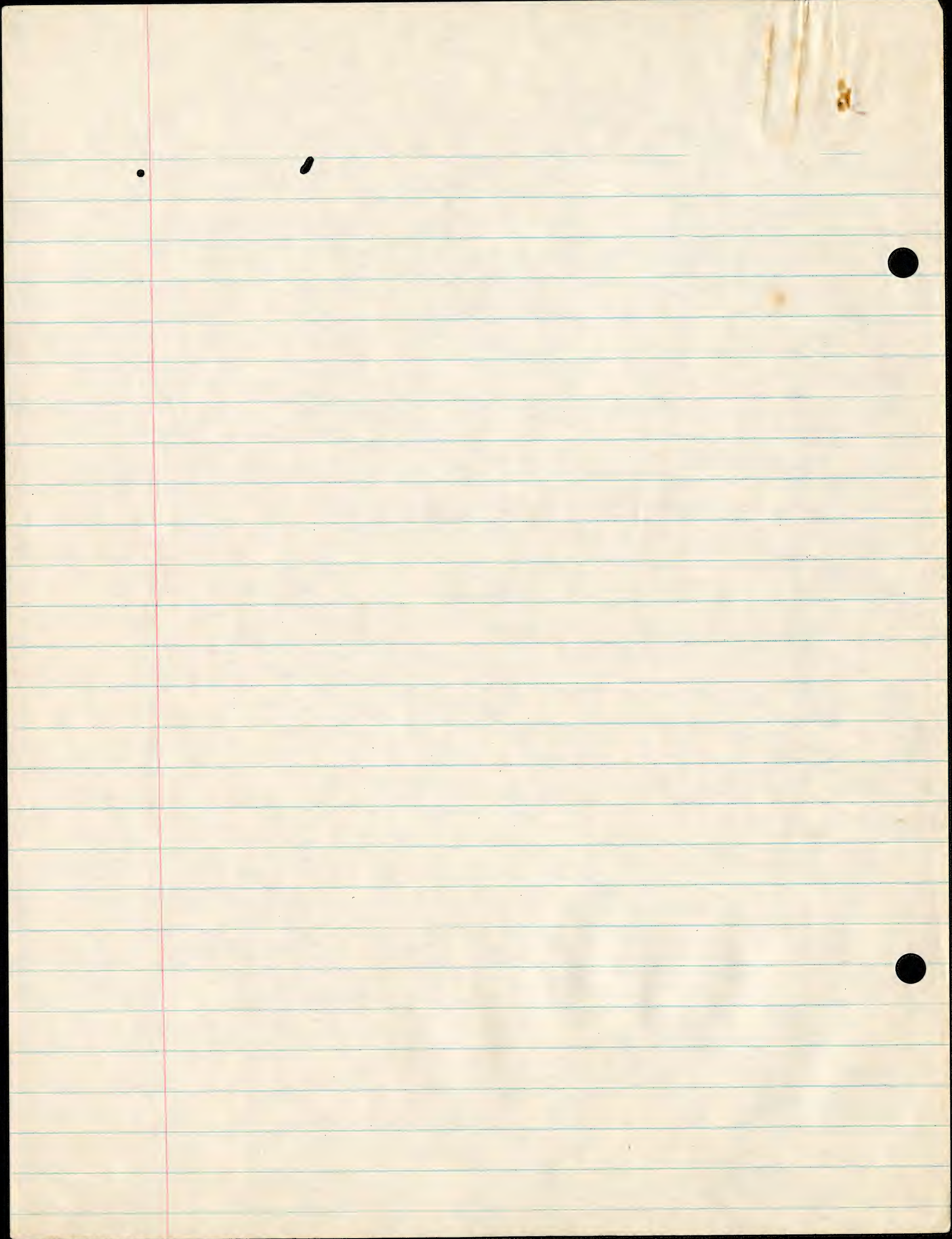
Alouatta palliata, I.

March 31, 1959

Y is now giving M's in addition to ab-type B when he is in his cage and badly wants to come to me.

ALOUATTA PALLIATA

II



Alouatta palliata, I.

(27)
May 8, 1959
Barro Colorado

I have been so busy for the last month or so that I have had practically no time to do much with the monkeys. Still I have noted the following in the case of the Howlers.

Y's behavior has shown various fluctuations - probably not primarily due to maturation or alteration of innate patterns as such, but to the degree to which I have allowed it to become fixated on me. During most of April I largely ignored it, and it gradually grew less dependent on me. Then, around the first of this month, I started to carry it with me again as much as possible, and it has again become very, very attached to me.

During the period I was ignoring it, it gradually became used to being alone, and did not call nearly as much when it was by itself. Interestingly enough, it stopped giving the Ab-type B almost completely (perhaps absolutely completely for a few days). Then, after being handled a lot again for a few days, it again began to give Ab-type B after I put it back in its cage after allowing it to ride on my neck. Yesterday its Ab-type B seemed to be "restored" to full strength. I carried it around for a couple of hours in the morning, then put it back in its cage, and it gave Ab-type B for hours on end for almost the whole of the rest of the day. This was as long, sustained & vigorous as the most intense Ab-type B ever given by A!!

At no time has Y ever given Ab-type B except when isolated. All or almost all the Ab-type B has always started immediately after it was put back in its cage after being allowed to ride on

my shoulders for a while.

These facts would indicate either one of two alternatives: 1) the Ab-type B is purely an isolation or abandonment pattern (at least now); or 2) the Ab-type B is a generalized distress reaction, but relatively high intensity, and only isolation or abandonment produces enough distress (at the present stage of the animal's development) to induce the call.

Surprisingly enough, I think the animal continued to produce occasional M-type Notes during the period in which it had almost or completely stopped giving Ab-type B. What does this mean ??? (I may be mistaken about this persistence of M - I must check on it.)

Y has continued Waa Notes much as before. These were quite common even when the Ab-type B was rarest. I am still convinced that these notes are probably really generalized distress notes (see Mar. 29), although it is impossible to prove conclusively that they are not just low intensity isolation or abandonment notes. In any case, Y still utters them when I handle it.

It also still goes into hostile high intensity B, now that it is fixated on me again, when its filial motivation is particularly strongly thwarted. This tends to occur when it is out of its cage, very near me, or even clinging to my legs or arms, when I physically prevent it from climbing to my neck. It then seems to work itself up into a real hysterical temper tantrum, screaming B's very rapidly at the top of its voice, and even jumping up and down, stiff-legged, just like an angry adult Howler in the wild, and even trying to bite me. This is certainly one of the clearest cases of frustration producing aggressive hostility that I have ever seen in an animal.

These outbursts of B when Y is prevented from climbing up to

my neck can be noticeably increased or prolonged if I poke it from time to time. Presumably an extra added stimulus to hostility. And Y gives exactly the same type of high intensity B when its hostility is provoked without any or without much, thwarted filial component. I.e. if I spank it, or if I give it a bath. If I spank it, and then put it down on the ground, it almost always continues to scream B's for a couple of minutes, usually backing away from me on its hind legs. This backing away must be an expression of the activated escape drive. It is only interrupted, occasionally, by some jumping up and down, on all four feet, which presumably occurs when the attack drive is temporarily in the ascendant.

This backing away on hind legs seems to be quite a characteristic pattern of the species (or at least of Y). When I put Y in the outside cage with all the other howlers, for a few minutes, the other howlers all came up & nuzzled it in the usual way. This occurred around May 1, when Y was definitely fixated on me, and it did not respond to the advances of the other howlers in any friendly manner. Sometimes it just moved away from them, and sometimes it went into Yld. Sometimes, however, it backed away from them, more or less steadily on its hind legs, striking at them with its front paws! This was obviously fairly high intensity hostility, largely produced by the escape drive, but the striking movements would also suggest that Y's attack drive was at least appreciable, even if much weaker than the escape drive. The most interesting aspect of Y's performance in these circumstances, however, was that it was quite silent throughout! This would indicate that even quite high intensity hostility may be silent when the escape drive is predominant. Not really what I would have expected on a priori grounds.

(I might add that the new howler Z - see below - showed

some evidence of similar behavior, silent retreat interrupted by some silent but apparently aggressive movements, when I first introduced into the cage with howlers C, D, and X.)

It is hardly possible that I have been overlooking a pattern performed by these young animals which is directly related to, and largely the equivalent of, the full-throated howling roar of adults. Whenever I pick up one of these young animals and it becomes particularly excited in a hostile manner (i.e. when I quit hold C, D, or X, or when I hit Y) it gives a burst of B interspersed with occasional longer (and possibly louder) notes. Usually single, sometimes repeated. At very high intensities and/or when the escape drive is particularly prominent, these longer notes become very high & shrill. They are obviously and undoubtedly strictly homologous with the Ser Notes of other species. They also, insofar as they appear to be the "climax" of B, closely resemble the roars of adults. I shouldn't be at all surprised if they were the pattern from which the adult roars eventually developed. I have heard these Ser Notes (as I shall call them, at least for the time being) uttered in essentially the same form by both C and Y, so they must extend over a considerable period of the life of these animals.

Y still shows signs of fear when the wild howlers Band Roar in the neighborhood of the station. Performs retreat and escape movements. Usually silent, but during the last two or three days I have several times heard it utter a single note when the wild animals began to call. A very long, low, throaty note, with a definite but slight quaver or rattle quality. Most similar to the M in tone. Such notes might conceivably be some low-pitched variant of the Ser, but I think that they are more probably the "wooden-sounding" Waa-type notes mentioned on Mar. 29, p. 24.

In the first part of April, when Y was still in its first period of fixation on me, it began to utter Mu, just like that of A, when it settled down on my shoulders. It stopped this during the period when I didn't allow it to settle on me very often, but it is now Mu-ing again like crazy. Almost always in the first few minutes after it has just settled around my neck. Frequently alternated with "Chewing", just like that of the other captive howlers I have had (and Callithrix).

I haven't heard Y utter any "Isk" Notes or Squ (or any "red" S Trill) notes, at least for a very long time.

One thing I forgot to mention above is that several times, in early April, I thought I heard Y utter Scr's at the climax of a long period of uttering "Waa" Notes. It is possible, therefore, that the Scr is the highest intensity reaction to several different kinds of frustration. This may be another resemblance to the Roars of adults.

Y has suddenly become very playful, especially when sitting on my shoulders. Wrestling with my ears, running up & down my face, rolling over on its back and hanging down my chest (hanging by its tail alone) etc. This behavior is sometimes accompanied by very, very soft (muffled) B notes, uttered in series with the same speed as ordinary loud B. I shall call this "Mock" B, for the time being.

Low intensity B is accompanied by a characteristic form of opening the mouth. The mouth is not opened very widely, but the corners are drawn back, so that both the teeth and the pink gums are displayed quite prominently. Obviously a form of BT; but I don't know if it is ritualized or not. High intensity B is accompanied by wide opening of the mouth. The teeth are then hidden or most inconspicuous, and it is the whole pink mouth that is prominent.

Alouatta palliata, May 8, 1959, VII.

(32)

The Waa notes are usually given with the mouth quite closed.

I have now found out what the "sticking out the tongue" pattern is that I mentioned above several times. It is definitely the preliminary phase of yawning. The tongue is always stuck far out and then retracted before the mouth is opened during a yawn. I don't know if the yawning in apparently hostile situations is ritualized or not.

Alouatta palliata, I.

May 10, 1959

Barro Colorado

Y now weighs 1500 grams. Pretty good!

The new arrival, Z, which I got a week ago, seems to be settling in well. My next to largest animal. Intermediate in size between C and D.

I spanked Y (alliert) today, and thus got some particularly good observations of the Sca pattern. The highest intensity Sca and/or the ones containing the strongest escape component are much shriller (sometimes very shrill indeed) than the Sca which are lower intensity and/or more aggressive. They all contain a "rattle undertone," a definitely vibratory quality! This rattle is much stronger & more conspicuous in the lower pitched Sca than in the higher pitched ones. The lower pitched Sca do have a hollow-wooden quality, although they are not at all plaintive, so they may be the notes that Y uttered apparently as a response to the Roaring of wild adults.

After Y had worked itself up into hysterics, screaming high intensity Sca steadily, I picked it up gently in my hands and it gradually calmed down, not completely but a lot. The interesting thing was

that its bers did not decline through B. The notes gradually slowed down, perhaps they became slightly longer, and the intervals between them certainly became longer. At the same time their quality changed. They became nasal, rather plaintive, "aaaanh" sounds. I.E. I think they became identical or almost identical with "Waaa" Notes. This would seem to indicate that the hostility declined faster than the general "discomfort" ???

Alouatta palliata, I.

June 7, 1959

Barro Colorado

⚡ Last Monday, June 1, I got still another Howler, from Stewart, the Pan Can geologist. Apparently almost fully grown, with conspicuous beard, and beginning of red fringe along flanks. Apparently ♀. I shall call this animal Φ.

When I carried Φ out to the island in a travelling cage, she was much upset. Sat in Hdd in corner a lot. The only notes she uttered were a few wigs, but sometimes repeated "Oo" or "Ow" Notes. Moderately soft. I wondered if there could be Alarm Notes? I shall call them "ab" for the time being.

Y (Albert - Lola) has uttered one or two similar notes once or twice when he is settling down after I have beat him. He might be expected to be somewhat alarmed in these circumstances.

In general, Y's behavior now is very much the same as before. I have n't heard him give Mu for a long time; but that may be because I have n't been carrying him so much recently. He doesn't give the "ab-type" B so much now - possibly for the same reason. Instead of ab-type B,

when I leave him in his cage, he gives really long whining Waa Notes, much longer and even more plaintive than earlier. Some of these are almost M-like. And it should be noted that he isn't give many typical M's these days.

He has developed a slightly new pattern today. This may be called "Tooth-grinding" (GR). Opening & closing the mouth regularly, at a moderately fast pace. Mouth only opened quite slightly each time. And each time the mouth is closed, there is a definite harsh rasping or grinding sound, apparently made by the teeth grinding together. This pattern is presumably a development of the earlier Chewing and/or Gnashing patterns. Difficult to tell what its significance might be, but it has been so conspicuous & common today that I think it must be display. Usually associated with fairly low intensity Waa Notes, when he wants to join me but isn't too very much upset about it. Possibly caused by the same factors as low intensity Waa.

It is my impression that when Y performs Sct now, he scratches his cheeks less often than he used to, and scratches other parts of his body (e.g. his sides) more often than he used to. Still usually scratching with hands rather than feet.

Y weighed approximately 1650 gr. this afternoon!

Alouatta palliata, I.

June 13, 1959
Barro Colorado

One thing I just realized today. I haven't heard Y give any very distinct M's for quite some time now. This may be "because" so many of its Waa Notes are so plaintive and prolonged now. It may be that its Waa and M patterns have "merged" so to speak.

Alouatta palliata, June 13, 1959, II.

(39)

A lot of the Waa Notes he is uttering now have a really pronounced rattle undertone. Particularly some of the longer Waa Notes. But they don't have the "wooden" or "hollow" quality of many L. T. of such species as Lagothrix.

Much to my surprise γ gave an unmistakable Mu once today when perched on my shoulder.

Alouatta palliata, I

June 19, 1959

Barro Colorado

Got another baby Howler. Possibly δ ? Much smaller than any other I ever had. Weighs only 500 gr. Still a trace of baby coat on back. I shall call this animal ϕ . Fairly well fixated on me, and moderately vocal.

There is no doubt but that its vocal repertoire is much more primitive or less differentiated than that of any other Howler I have had.

It performs approximately four to six "distinct patterns" in various circumstances. It is difficult to determine the exact causation of each particular type of call. To some extent, they appear to be purely "intensity levels" of a single pattern; but this may be slightly misleading.

The lowest intensity distinct reaction is what might be termed "Silent Barling" (SB). If, for instance, ϕ is clinging to me, and I start to lift him off, he frequently opens his mouth once or twice, not very rapidly (but not very slowly either). This appears to be the lowest intensity form of the "Barling Complex". The mouth movements are the same as during B and Squ (see below), and the pattern actually seems to intergrade with B through Squ. The SB is, how-

ever, really quite silent — except for a small sound, just like the sudden expulsion of air a person might make when suddenly hit in the stomach.

Another pattern obviously closely related to SB is the "Squeak" (Squ). A thin, high pitched, moderately long, mournful sounding squeaky note. With the same mouth movements as SB. Φ tends to utter this note when I lift it off me a little farther and more roughly than when it performs SB. I have also heard it give Squ's when I lifted it roughly off my desk (i.e. when it had not been clinging to me). This might conceivably suggest that the Squ contains an appreciable escape component. In any case, it is obvious that the Squ is exactly intermediate between the SB and one of the more bark-like notes, probably pure B in all or most cases I think.

Φ also has a pure B quite like the other Howlers I have had. It sounds almost exactly like the B of older Howlers, except that the series of B Notes are never quite as long as the longest series of B's uttered by older animals, and the individual B Notes are never uttered quite as rapidly as they usually are by older animals. The typical B uttered by Φ is probably also slightly hostile. This is the sound he utters if he is struck lightly. He also utters it when his infantile drive is greatly thwarted, when his frustration seems to irritate him. When his infantile drive is slightly thwarted, i.e. when he has been taken off me but I am not too close to him, he utters notes which are apparently the "forerunners" of Waa Notes and ab-type B (see below), but when I come very close to him and still don't let him climb on to me, he switches to the real typical B.

I should not be surprised if all the series SB-Squ-typical B turned out to contain a definite hostile component.

Φ also seems to have some trace of the usual patterns which appear to be produced by thwarted filial motivation without hostility.

When, for instance, he is sitting by himself and I come to him, but not too close, and speak to him he utters notes which appear to be early forms of Waa and ab-type B. The Waa Notes would appear to be lower intensity than ab-type B. They are the notes he begins by uttering just as he wakes up, and they may be replaced by ab-type B as he becomes more active. And when he only utters one or two notes, these are almost always Waa alone. Sound very much like the Waas of all the other howlers I have had. Nasal, hoarse, and plaintive. The lower intensity forms of Waa are uttered with the mouth almost or completely closed, without movements. These notes tend to be relatively soft. Louder, and presumably higher intensity, Waas are accompanied by definite opening & closing of the mouth.

After Φ has uttered a few Waa Notes, if he still can't get into contact with me, he may begin to utter ab-type B Notes. These notes are apparently exactly like typical B Notes, except for the fact that they are uttered in short bursts. Usually two notes — — Occasionally a burst of three — — —

There is no doubt but that Φ's Waa, ab-type B, and B Notes are less sharply distinguishable than those of any other Howler I have had. It would be impossible, in all or most cases, to distinguish between a short burst of typical B and a burst of ab-type B. And Φ's Waa Notes are always relatively short, more like typical B Notes than those of any other Howler I have had, and seem to intergrade completely with perfectly typical B Notes.

I have yet to hear Φ utter M.

One peculiar aspect of Φ 's "filial motivation" is that it seems to "cease" completely when I am completely out of sight. In other words, he usually or always stops calling completely as soon as I move far away or behind a barrier, even when he has been calling vigorously with Waa, Ab-type B, or B as long as I was moderately nearby. (Other Howlers I have had have probably behaved in a somewhat similar way, but older animals have more of a "carry over", continuing calling some minutes after I have gone from sight.)

Like the other young Howlers I have had, Φ seems to react to me and to heat (i.e. a lamp) as if we were exactly equivalent.

Φ does not seem to have an set pattern of any sort. Probably "because" his muscular coordination is so poor. (He can barely walk now.)

Yesterday, just after I fed him, Φ seemed to be very hungry. I gave him some milk, and he gave a perfectly typical Mu as he lapped it up eagerly. "Contentment"? Or just that he couldn't get the milk in as fast as he wanted to?

Alouatta palliata, I.

June 28, 1959

Barro Colorado

Carpenter has just pointed out to me one aspect of γ 's behavior which I had not noticed before. Sometimes, when I am near its cage but refuse to allow it to climb up on me, it will eventually subside and utter a few Waa Notes as it curls up in a very huddled position. This position may be nothing more than an intention movement of going to sleep, but it is also possible that a real Hdd pattern may be produced by frustrated filial or gregarious motivation as well as direct hostility.

Alouatta palliata, ±

August 18, 1959
Barro Colorado

I have been far too busy to do much with the monkeys recently.

The only interesting things I have seen occurred when I split up the capture howlers I still have. Y has always been kept apart from the others and has flourished. But C, Z, and X have been kept together in a large outside cage, and have not gained weight nearly as rapidly as Y. So I have taken C (the largest animal) and separated it from Z and X. I put C in a small outside cage with Y and the young est capuchin. I put Z and X together in a small inside cage.

C spent most of the first day after being separated from Z and X giving Ab-type B. Obviously due to frustrated gregariousness. Usually 3-note — — — Sometimes the long middle note was quite definitely M-like in quality.

Z and X did not utter Ab-type B after being separated from C. Presumably they satisfy each other.

I have been making a few feeble attempts to tame X (the smallest of the animals). It is really quite incredibly shy. Does lots & lots of B when I pick it up, but then quiets down if I hold it very firmly (although it always tries to escape if I should loosen my grip momentarily). The interesting thing is, however, that if I stroke it gently after it has quieted down, it always or almost always utters Waa Notes! (If I stroke it roughly, it reverts to giving B). This would indicate that the Waa is either a general frustration pattern or (more probably ???) definitely hostile.

Alouatta palliata, INovember 13, 1959
Barro Colorado

Haven't had much chance to watch these animals lately, what with being away in Europe so long, and being so busy since I came back.

C died recently after being sick a very long time. Worms?

Y was very sick for a while, but now seems to be flourishing. (It developed a traumatic cataract some time ago — presumably as a result of some early injury — but doesn't seem to be bothered at all by it.)

Y, X, & Z are all in a large outside cage by themselves now.

Y's behavior seems to be much the same as before. Same range of calls; (although I haven't heard it give Mu for some time now — probably because I don't carry it much now.)

I have noticed that all 3 animals now give ab-type B early in the morning when they are hungry and waiting for their food to appear. This must be significant — at least in the cases of X and Z (it is always possible that Y is just reacting to my absence at any time). Means that the ab-type B is definitely a generalized distress call, as X and Z are completely fixated on each other and their gregariousness and/or infantile motivation cannot be really frustrated as long as they are together.

Alouatta palliata, IJuly 10, 1960
Barro Colorado

Unfortunately, an epidemic carried off all my Howlers, one by one, except Z. Z, however, is flourishing exceedingly. (Z = "Bully")

He has developed into an unmistakable ♂. One testes fully descended, the other partly so. Occasional erections. A moderately developed beard, a slight trace of reddish fringe along the sides. Can produce the full Roar of adult ♂'s. Still very active and "playful", however.

I have been acquiring new Howlers since the epidemic. These include the following.

Shirley Temple. Fell out of a tree near the clearing a couple of months ago, and caught by one of the boys. Quite small. Apparently in good health, but quite shy, easily frightened, and rather "mild-mannered". Certainly not fixated on me.

Gladys. Bought in the market about a month ago. Larger than Shirley Temple, but not much. Not fixated on me, but not nearly as shy as Shirley Temple. Apparently has just reached the playful stage.

Both Shirley Temple and Gladys seem to be typical of the local populations of Howlers. Quite black all over.

Shirley Temple and Gladys were kept in a small inside cage together for several weeks. Became fixated on one another. Then moved into a big inside cage with Bully (Z). Scared stiff of Bully at first, but have now settled down quite well. Shirley Temple is still fixated on Gladys, but I think that Gladys has become fixated on Bully. At night, now, Shirley Temple sleeps by herself, near the lamp, while Gladys and Bully sleep together, away from both the lamp and Shirley Temple.

I also have two other young Howlers: Goldilocks & Narciso. They have been bought, from the same dealer, (on J Street), during the last couple of weeks. Goldilocks is about the same size as Gladys. Very

tame. Obviously someone's pet before I got her. Quickly transferred her affections to me. As fixated on me as any monkey I have ever had. Very healthy. Narciso is much smaller, even smaller than Shirley Temple. Also quite tame and fixated on me (perhaps not quite as strongly as is Goldilocks, however). Not very healthy, very quiet and apparently "debilitated", but perhaps making progress. Goldilocks & Narciso are kept together, in a small inside cage, apart from the other Howlers. They do not seem to be very well fixated on one another yet.

Goldilocks, and (to a lesser extent) Narciso, are both quite distinctive in appearance. Both have relatively long & narrow-looking bare faces, and both are "blondes". Goldilocks is bright golden yellow on the lower back & flanks. This patch is really very extensive. She is certainly far too old to have retained the first infantile pelage. Narciso is also yellowish on the lower back and flanks, but his light patch is much less extensive than that of Goldilocks. On both animals, the yellow intergrades quite gradually with the black, especially on the back.

I think it is quite possible that the peculiarities of Goldilocks & Narciso are "sub-specific". They may come from the Colombian border region.

I have not been paying much attention to the behavior of Goldy and Shirley Temple. As far as I can tell, their reactions are very similar to, or identical with, those of the other young Howlers I have kept. They perform SB, B, and Ab-type B. They also perform the usual Howl or type of Sct. They also "greet" or investigate strangers in the usual way, sniffing nose to nose or nose to tail.

I have spent a little more time studying Goldilocks and Narciso. Their behavior also seems to be at least very similar to that of the other young Howlers; but I shall describe it in somewhat greater detail.

The most interesting observations I have made recently have involved the Ab-type B pattern. I am now more than ever convinced that it is a generalized distress reaction rather than the result of thwarting filial motivation alone.

The behavior of Shirley Temple, when I first got her, was particularly significant in this connection. She would sit quite quietly when alone in her cage — and then start to utter Ab-type B when I started to pick her up!!! This Ab-type B was certainly not purely filial. Her reaction to being picked up, at least at first, was obviously largely or completely hostile. She struggled to get away from me and/or tried to bite me. Also she frequently uttered B before and after Ab-type B in such circumstances.

As far as I know, Shirley Temple never uttered Ab-type B when isolated by herself alone. Only when I tried to pick her up.

The behavior of Goldilocks has been almost equally suggestive. She has uttered quite a lot of Ab-type B, along with ordinary B and Waaa notes, when she wants to climb on to me. When I approach her cage closely, before picking her up, and especially when I have just taken her off me. Such Ab-type B may well be the result of thwarting of some filial motivation, but other Ab-type B performances are rather different. Twice today, for instance, I let Goldilocks sit on my head for long periods of time, once in my house and once in the dining room. She sat very quietly and happily for some minutes (occasionally uttering Mu — see below); then started to utter Ab-type B, and immediately moved off my head. Started to roam around the room(s), uttering lots of Ab-type B (occasionally interspersed with ordinary B), obviously "searching" for something. Occasionally would return to my head, settle down quietly for a few seconds.

do, then utter more Ab-type B and immediately start searching again. I think that she may have been looking for food during such searching. I am almost certain that she was not looking for Narciso, her cage-mate, as she does not seem to be greatly attached to him. (This evening she remained sitting contentedly on my head, even though Narciso was uttering Ab-type B in the next room (out of sight)).

These incidents do not absolutely preclude the possibility that at least some slight filial motivation is thwarted during all Ab-type performances, but they do make it seem most unlikely.

Both Goldilocks and Narciso utter Waaa Notes as well as Ab-type Notes, but they utter these notes with very different frequencies. The healthy active Goldilocks utters lots of Ab-type B (+ ordinary B), even when I am right outside her cage, when she wants to climb on to me. She only utters relatively few Waaa Notes in such circumstances. The less healthy and active Narciso utters many, many Waaa Notes in such circumstances, and relatively few or no Ab-type and ordinary B Notes. (He only utters Ab-type B frequently when locked in a strange room, away from me.)

The circumstances in which both animals utter Ab-type & Waaa Notes, however, would confirm my earlier theory that the Waaa Notes are essentially or completely short-range patterns, while the Ab-type Notes are largely (almost completely ????) long-range patterns.

It is now fairly obvious that both the Waaa Notes and Ab-type Notes are non-hostile reactions to some kind(s) of thwarting, while the ordinary B Notes are hostile reactions to some kinds of thwarting, possibly sometimes the same kinds of thwarting. I am also beginning to think that all the Waaa Notes may be always the result of thwarting filial motivation, in contrast to the Ab-type Notes which may be pro-

duced by any one of several different kinds of thwarting. (The not-very-healthy Narciso seems to have become particularly dependent and infantile - like all sick monkeys).

Goldilocks' Ab-type B usually includes more notes, and is much more frequently associated with ordinary B, than is Narciso's Ab-type B.

Goldilocks, at least, frequently performs M, during high intensity Ab-type B. Like many of the M's of other animals I have observed, her M's seem to overlap some of the Ab-type Notes. More or less come
me go.

Black = Ab-type Notes
red = M Note

Like many of the M Notes of Night Monkeys, their M's appear to be little or nothing more than "by-products" of the production of other notes. Difficult to determine if they have their own peculiar causation.

Low-intensity Waa Notes and ordinary B Notes may be uttered with the mouth apparently absolutely closed. But I think that the mouth is usually opened (& closed), a little, during most Waa & ordinary B performances. It certainly is during some of these performances.

I think that the mouth is always opened (& closed), a little, during all Ab-type performances — at least during the loud notes of the Ab-type B.

When the mouth is opened slightly, at least during the Ab-type

and ordinary B Notes, the corners of the mouth are pulled out further than the center.

Both Narciso and Shirley Temple, the smallest animals in their respective groups, have performed lots of "SB." Usually an obviously defensive reaction to "mauling" by their companions. (In most cases, at least, this mauling seems to have been an invitation to "play" wrestling.) Mouth opened very widely and kept wide open, with little or no movement. Emphasizing pink mouth very conspicuously. Sometimes this is quite silent. Sometimes accompanied by rapid, rather muted B Notes. As the opening of the mouth seems to be the most important feature of this performance, I shall call the whole pattern "MOP", and specify, each time, if it is accompanied by B or not.

The MOP is obviously high intensity hostility, with escape strongly predominant. Frequently accompanied by overt escape movements, frequently (but not always) retreat standing up on the hind legs, facing the opponent all the while.

I presume that the silent MOP is either lower intensity, or contains an even stronger escape component, than MOP + B.

I might add that I am not sure that the soft B Notes frequently accompanying MOP, are really different in sound from some ordinary B Notes uttered without MOP.

(I forgot to mention that I have been able to confirm, repeatedly, that higher intensity ordinary B Notes, without MOP, are much higher pitched, and probably somewhat longer, than lower intensity B Notes.)

Goldilocks seems to utter Mu in more or less the same circumstances as the other young Howlers I have had. She also, however, sometimes utters 1 or 2 Mu's, after a long period of silence, while sitting quite quietly on my head, even when I don't touch her or otherwise disturb

her in an obvious way. She may then utter 1 or 2 Mu Notes and then subside into apparently contented silence. Certainly this looks as much like a pure "contentment" pattern as anything I have ever seen.

Both Goldilocks and Narciso have also performed a lot of "chewing" or "gnawing" patterns. (Relatively silent chewing and relatively loud gnawing seem to intergrade completely.) Difficult to determine the stimuli provoking such behavior. Narciso, for instance, may gnaw frantically for quite a long period of time all by himself. But I have noticed that Goldilocks, at least, always or almost always does some chewing just after I have let her climb on to my head, just as she seems to be "settling down" comfortably.

Both Goldilocks and Narciso have uttered single plaintive, rather squeak-like notes from time to time. These may be what I called "Squ" earlier. I think that all these have been low intensity indications of the Waaa pattern. Tend to occur just after an animal settles down on me, and/or when I make a slight movement to take it off me.

Alouatta palliata, I.

October 1, 1960

Barro Colorado

I have been far too busy recently to do anything intensive with the Howler Monkeys; but I have noted a few of their behavior patterns from time to time.

I have been paying particular attention to Bully (Z). He seems to be flourishing, although he does have a tendency to diarrhea. Both testes descended now (most of the time — they seem to be retracted when he is cold); but still, I think, smaller than those of adults. Only a little reddish fringe along his sides.

Bully has been very "playful", engaging in mock wrestling matches and mock fights with his cage mates, (he is usually the aggressor during these encounters), ever since he recovered from the illness that carried off all his earlier companions. His playfulness has not decreased since his testes descended. Gladys is getting more and more playful all the time. Goldilocks is also very playful. Even Narciso is quite playful, although it is so much smaller than Goldilocks that it has rather a rough time during most wrestling bouts. Only Shirley Temple is not playful at all. Presumably because it is so much smaller than both its cage-mates (Bully and Gladys) that it always has a very hard time when they try to play with it. Shirley Temple spends most of its time in the corner of its cage, in more or less definite Hdd, "muzzing". Every time Gladys or Bully approach it, and give it a poke or a pull, it turns on them, uttering "Furious", obviously very high intensity, high-pitched, urgent-sounding, very rapid (almost continuous) B. This sort of B is almost always accompanied by MDP throughout. Sometimes accompanied by sticking with the hands. (This species also fights by sticking with the hands quite frequently.)

I find that I can always provoke Bully into performing hostile behavior (possibly partly "mock") by going up to his cage and "barking" at him. He always utters B's in return. These are always fairly low intensity. Low-pitched, and the successive notes separated by quite appreciable intervals. All or most of these B's are uttered with the mouth almost or completely closed. When the mouth is opened only slightly, it is only the corners that are opened (the lips remaining firmly pressed together in the center). The visual effect of such slight opening is most peculiar, as the inside of the mouth are light pink. When only the corners of the mouth are opened, this displays two conspicuous light pink spots on either side of the otherwise completely black face.

This Big Bully is always accompanied by much activity. A few scratching movements of the usual Howler type (i.e. hand scratching side of the face, on the same side). A few definite Sct's. Lots of running and leaping back & forth, and swinging on the poles in his cage. Also a lot of what appears to be a definite ritualized Jnd pattern. This Jnd is much less extensive than the Jnd of White faces. Bully may perform the intention movements of jumping up and down, i.e. straightening the legs and flexing them alternately, but I don't think he ever actually lets go of his perch (with either of his hands, or his feet, or even his tail). Another pattern which seems to be part of Jnd is lunging back and forth, repeatedly and rapidly. This may be accompanied by some stretching and flexing of the legs, but again he always keeps his hands, feet, and tail firmly grasping some support(s).

I frequently let Bully out of his cage. He then runs around, and we engage in mutual Belupites. He performs Sct, Sct's, and Jnd in these circumstances as well as when he is in his cage. In addition, I have several times seen him assume a definite Arch Posture when engaged in a dispute with me outside his cage. Quite like the Arch of Night Monkeys in form (see the drawing in the large sketch pad). But obviously much rarer, and presumably less important in the social life of the species. Some of these Arch Postures were accompanied by the usual low-intensity type B; others were silent.

When Bully gets out of his cage, he frequently runs over to the tops of the cage of Goldilocks and Narciso. He may perform B, plus Jnd, etc., there; or he may just SNF at them. In any case his presence usually drives Goldilocks and Narciso into transports of fury. They also fight among themselves a lot. As a result I have seen quite a lot of their hostile behavior. They both perform Sct and Jnd like Bully, and utter high intensity B, with MOP, like Shirley Temple. I have also seen Narciso (not Goldi)

locks, I think) perform Ish's, like Bully.

• Both Bully and Goldilocks have performed frequent redirection attacks. Goldilocks almost always attacks Narciso when Bully comes over to their cage. (Goldilocks can't get at Bully through the wire mesh - besides it would probably be afraid to attack Bully, even if it could.) The usual sequence is as follows: First Goldilocks threatens Bully, usually with MOP and Jud, then it immediately turns to attack Narciso (who is probably also threatening Bully with MOP and Jud at the time), then it goes back to threatening Bully, then it turns to attack Narciso again, etc., etc., etc. Bully's redirection attacks have been performed during barking matches with me. He almost always interrupts such matches, usually repeatedly, to go over to push, pull, or actually leap onto, Gladys and/or Shirley Temple (this is the preliminary to wrestling with them.)

I can say just a little about the motivation of these patterns. Low-intensity and high-intensity B have already been discussed. So has MOP. Set seems to be very low-intensity. Usually at the beginning or end of disputes. Usually silent. Apparently never with MOP. Ish's seem to be quite high intensity, possibly aggressive. Narciso, at least, usually performs Ish's with silent MOP. Jud seems to occur during both high-intensity and low-intensity disputing. Arch Postures only during high-intensity disputes. Redirection attacks also seem to occur only during high-intensity disputes. Obviously produced when the attack drive is very strong, and the escape drive is at least moderately strong. The great problem in analyzing all these patterns will be determining the relationship between silent and vocal patterns!!!

About a month ago, there were quite a lot of wild Howlers around the animal house for several days. Bully tended to utter a lot of low-intensity B's when he heard them making a variety of noises. He also Howled, in the completely adult manner, whenever the wild Howlers howled.

At this time, whenever Goldilocks heard Bully and the wild Howlers Howling, it usually uttered prolonged and repeated Waa Notes. Would this suggest that the Waa Notes of infants are homologous with the Howling of adults? (I don't know if I have already mentioned it or not, but Goldilocks always uttered lots of Waa Notes — more than any other young Howler I have ever had — in all sorts of circumstances for quite a long time after we first got her.)

Since then, both Goldilocks and Narciso seem to have stopped both Waa Notes and ab-type B completely. They still like to climb upon me, however. When prevented, or taken off me, they usually utter ordinary low-intensity B or remain silent now.

Sometimes, in such circumstances, the last few B Notes they utter are definitely more plaintive, "pleading", in sound than the first notes. The last B Notes uttered by Bully after a barking match with me may also be rather plaintive. It is possible that these plaintive-sounding B's are something quite different from ordinary B's — but I doubt it. (They are certainly not the same thing as the M's I have heard earlier. Just modified B's at best.)

Alouatta palliata, I

October 16, 1960
Barro Colorado

Today I changed some of the animals around. I took Goldilocks out of the small cage with Narciso and put it in the large cage with Bully and Gladys, and took Shirley Temple out of the large cage and put it in the small cage with Narciso. I thought Shirley Temple was getting too battered by Bully and Gladys.

As might be expected, both the animals which were changed uttered a lot of ab-type B during the hour or so after they were changed. Shirley Temple's ab-type B included a definite M component. More or less common ca

(I am not quite sure that the M component really began later than the main, loud, note.)

Goldilocks' Ab-type B did not contain any M components, but was usually composed of many more notes. Comme ça:

— — — — — Quite stereotyped

Goldilocks seemed to be quite afraid of Bully and Gladys, and spent most of its time huddled in a corner of the new cage. Usually silent, except when uttering Ab-type B. Whenever I came up to the cage however, it would rush to me, uttering very excited, long, rapid, series of ordinary B Notes. Obviously wanting and expecting to be let out. It is interesting that it didn't utter Ab-type B or Waa Notes in such circumstances. When I did not let it out, it usually turned and left the cage furiously. Obviously frustrated.

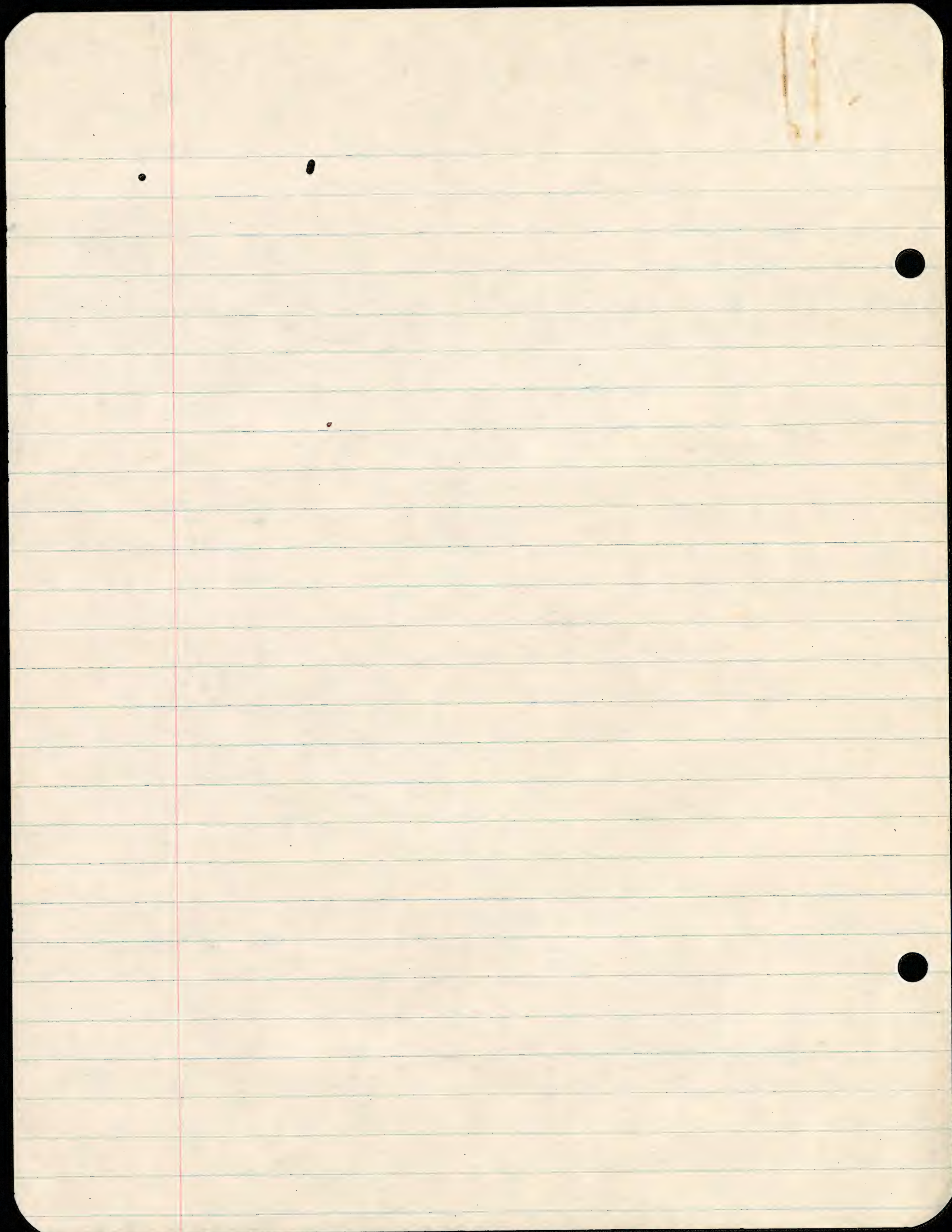
Neither Bully nor Gladys reacted to Goldilocks very strongly. But just after I first put Goldilocks in their cage, Bully uttered a few distinctive single note. Like wooden, "hollow", B's, (B's without any "roaring" quality). Sometimes slightly plaintive in tone, but much less so than M Notes. They appeared to be a sort of "mothered" or half-suppressed B. I shall call them "HB" from now on. They may be a very low intensity form of B, or even contain a "friendly" element.

I have heard Bully utter an occasional HB before, but never in illuminating circumstances.

It is interesting that none of the animals which were left in their old cages, i.e. Harano, Gladys, and Bully, reacted to being separated from their old companions by uttering Ab-type B or any comparable call. I.E. the Ab-type B is really much more of a "lost" call than a reparation call. All Harano, Gladys and Bully did was listen more or less intently when the

ALOUATTA PALLIATA

III



or while companions uttered Ab-type B, and, sometimes, look toward their erstwhile companions.

Alouatta palliata, I.

October 20, 1960

Barro Colorado

Shirley Temple and Goldilocks have reacted to their new surroundings in slightly different ways. Shirley Temple approached Narciso, and allowed itself to be approached by Narciso, almost immediately after being put in its new cage, even when it was still uttering Ab-type B very frequently. Goldilocks, on the other hand, still has hysterics (uttering high intensity B with extreme BT) whenever Bully comes near, and still retreats from Gladys (although seldom uttering B + BT) whenever the latter comes over and tries to play. This difference between Shirley Temple and Goldilocks is probably the result of 2 factors. It is probably partly due to the differences in their ages. And Goldilocks is also very afraid of Bully, who is much larger. (Goldilocks and Gladys are approximately the same size, although Gladys is a little larger. Shirley Temple and Narciso are also approximately the same size, although Narciso is a little larger.)

Gladys, who had very bad fur when we first got it, has now grown a beautiful new coat. With a sprinkling of golden hairs along the sides and on the lower back. So it may have a few Red Howler genes too.

This morning I heard a wild baby Howler utter a lot of Ab-type B (always or usually of the 3-note type, I think), and a few Waa Notes quite like those of my captive animals. But unfortunately I couldn't locate the animal which was uttering these notes (it was raining quite hard at the time).

Alouatta palliata, I.

February 13, 1961
Barro Colorado

While I was away on vacation, Nov - Jan, both Shirley Temple and Narciso died. The other three continued to flourish.

Since my return, I have got two new individuals. One an apparently adult ♀, "Ramona". Dreadfully battered and scraped when I got her, but otherwise quite vigorous and apparently in good health. Settling down well, and her wounds are healing. The other is quite a small young animal, "Ornan", very shy and wild.

Ramona was probably raised in captivity. She didn't know what to do with leaves when we first got her.

Ramona was kept in a cage by herself for the first few days. Then I put her, still by herself, in a big cage right next to the big cage which contained Bully, Gladys and Goldilocks. All four animals apparently greatly excited. Ramona did a lot of Suf toward the other 3 animals, and they did a lot of Suf toward her, through the netting of their cages. A lot of this Suf-ing was face to face, but part of it did not appear to be very well orientated in any way. One animal would just Suf at any part of another animal. At the same time that this burst of Suf-ing occurred, some or all of the animals (I am pretty sure all) uttered lots and lots of plaintive "Oo" or "Ow" Notes. Usually in series of indefinite length. Rather reminiscent of M Notes, but slightly different, I think. Clearer & louder. With a definite "oo" or "ow" quality. Obviously at least partly forcibly. Not accompanied by any B. Usually or always uttered with the mouth quite closed.

I have heard these "Ow" Notes uttered by captive animals before, but only very rarely. I have heard them uttered more frequently by wild anim

als in the forest (when they tended to occur in indeterminate series, just as during this incident when Ramona met the other captives). I always presumed that they were just low intensity B before, but they are obviously something rather special.

After several days, we put Bully in with Ramona, and Omar in with Gladys and Goldilocks. They all seem to be settling down well with their new companions, although Ramona and Omar are both still a little nervous.

The animals have not altered as much. Our Notes since their first encounter, but some or all of them still utter a few brief series of Ow's from time to time, when they get particularly close to an animal with which they are not too familiar. Ramona (at least) also utters brief series of Ow's, sometimes, when I come moderately close to her cage. So the Ow's may contain a slight hostile component in addition to their dominant friendly component.

When I come very close to her cage, Ramona usually just sits quietly in a well-marked Hdd Posture. Usually silent. Sometimes utters a few brief B's.

If I continue to stand by her cage for some time, Ramona frequently begins to "yawn" (complete with preliminary sticking out of the tongue). I am beginning to think that this must be significant. "Displacement." (The other animals also yawn from time to time, but I don't know if their yawning is significant or not.)

The black part of Bully's scrotum is beginning to turn white, in patches, now. Both testes permanently descended. He must be nearly adult now.

(2)

Alouatta palliata, I

August 13, 1961
Barro Colorado

Unfortunately, both Ramona and Goldilocks died a few months ago. But Bully and Geadys seem to be flourishing. Bully's testes are completely white now. He is presumably adult. And Geadys seems to be almost adult. She has developed a quite long but scraggy beard during the last month or so.

The day before yesterday I got 2 new baby howlers. Both are smaller than I have ever had before. One is very much smaller. I shall call this very little one "The". Definitely a young "infant 1" according to Carpenter's classification. Pelage completely grayish. Sparse. Pinkish skin showing through quite prominently on limbs and body (naked face is grayish). The other infant is about $\frac{1}{4}$ or $\frac{1}{3}$ larger. I shall call it "Mike". Probably an old "infant 1". Pelage appreciably darker than The's, but still definitely silvery.

I am starting to experiment with these animals tonight, at 7:30 p.m. Starting with The.

The spends most of his time sleeping quietly on a towel. Just moves around a little bit from time to time, presumably to get more comfortable. At such times he utters a few "Waaah" type "distress notes". He also utters such notes when I poke him while he is sleeping, or move him (gently) a little.

These "Waaah" type notes are extremely variable. Sometimes very short, sometimes quite long.

They all have a "vibratory" quality, at least some degree of "hoarseness".

The shortest notes have a faint "Isi" quality. Slightly sharp.

These are presumably the notes I originally called "Isi" Notes

The vibratory quality mmm is more pronounced in the longer notes. If she is picked up and handled roughly, or taken off its towel and put on the cold floor, it begins to utter increasingly longer and louder notes. Almost all these longer and louder notes would have to be transcribed as "Waaaaah" or "Oooooah", but they are obviously an variant to other calls besides (or in addition to) the typical "Wah" Notes of older infants and juveniles.

Sometimes she will utter a loud "Waaaaah" Note with a very pronounced rattling quality MMM. Such notes sound very much like the wooden L-Hill's of young Woolly Monkeys. She utters such notes both when being handled roughly and when isolated on cold floor. Sometimes such notes are preceded by softer notes (thus forming an Ab-type call - see below), and/or followed by softer notes (the softer notes both before and after are usually relatively short). At other times, presumably when the little thing is disturbed fairly suddenly, the L-Hill-type notes are not preceded by "introductory" notes. Nor are they always followed by other notes.

Some of the long and loud "Waaaaah" notes have much less vibratory quality. No more than the short and soft "Wah" notes.

Sometimes she will utter a call which is quite reminiscent of the Ab-type B of older animals. Both when handled roughly and when isolated on cold floor. Usually consisting of 3 or 4 notes quite close together.

— — — — —

The longer central notes are "argant" sounding like the central notes of the Ab's of older animals. Sometimes with an L-Hill quality, sometimes without. There seems to be a complete intergradation between long "Waaaaah"

notes with a very strong L-Fill quality and those with only the faintest hoarseness.

She can utter Ab-type B's with both or either an L-Fill quality or only faint hoarseness both when being handled roughly and when isolated on floor. (I.E. the Ab-type calls may not be purely "lost calls" yet.)

She usually utters all these various types of "Waaah" like notes in series when distressed to a moderate degree or more. Frequently jumbled together apparently at random. The Ab-type calls are only partly segregated yet. I.E. She may utter notes comme ça.

In this case, the last 3 notes may be considered a distinct Ab. But She may also utter notes comme ça.

In this case, there are no distinct Ab's.

I have not been able to determine why some of the long "Waaaaah" notes have an L-Fill quality while others do not. Both types of notes seem to occur in the same circumstances. And are accompanied by similar clutching and locomotor movements.

All this would suggest that She has a single "Distress Call" pattern now. With variations. Variations beginning to segregate out to form the differentiated patterns of older infants - but only just beginning!

She has done absolutely nothing which sounds like the B or M patterns of older infants.

Alouatta palliata, I.August 14, 1961
Barro Colorado

I kept The and Mike in my house last night (no power in the animal house!).

The became uncomfortable from time to time, and uttered a variety of Duties Notes from time to time. As described above.

Some of the very shortest and softest of The's Duties Notes are slightly Squ-like. But never completely Squ. And such notes are relatively very rare.

The hasn't done anything like real SB yet.

Nor has it performed overt escape. When poked, it just utters Distress Notes (and clutches its towel more firmly). Doesn't make any real attempt to move away.

Testing Mike this evening, 9:45 p.m.

When isolated on floor, utters a few short "Waaah" Duties Notes. Plus one or two single loud L-Hill type notes. Plus one Ab-type series.

— — — Central note with only faint rattle undertone. Then starts crawling. Continues to utter occasional single or double "Waaah" Note. Usually with quite pronounced L-Hill quality.

When poked and handled roughly, utters a few nondescript short to medium length "Waaah" Notes. In irregular series. Then utters a fairly rapid series of 6 or 7 rather short but rather loud "Waaah" Notes, rather deep in pitch, which sound as if they might be the first stage of B (only very poorly segregated as yet).

Last night, after being disturbed, Mike uttered 2 or 3 Mu type notes as it settled back on its blanket. Quite like the Mu's I have heard

uttered by other young Howlers. But also hardly distinguishable from very soft "Waaah"s. (Such Hui-type notes differ from the Ish-type short "Waaah"s in being a little longer and less sharp, but not much softer.)

All this is beautifully consistent. The "Waaah" Distress Notes of young Howlers are strictly comparable to the Distress Notes of young Night Monkeys and young pinche's. Only they tend to break up into separate patterns, each with its own causation and function(s), at a comparatively very early stage.

Mike's vocal repertoire would seem to be considerably more advanced than The's.

It seems likely that the L-Hll type notes uttered by Mike when isolated tonight were somewhat lower intensity than the most urgent sounding central notes of the Ab-type calls. The most urgent sounding notes did not have much of a rattle undertone. And some of the notes which had a very pronounced L-Hll quality were moderately short.

The L-Hll type notes of infants are probably strictly comparable to the wooden, "hollow", ratchet type notes sometimes uttered by adult (or older juvenile?) howlers at the very beginning of early morning howling in the wild.

Alouatta palliata, I.

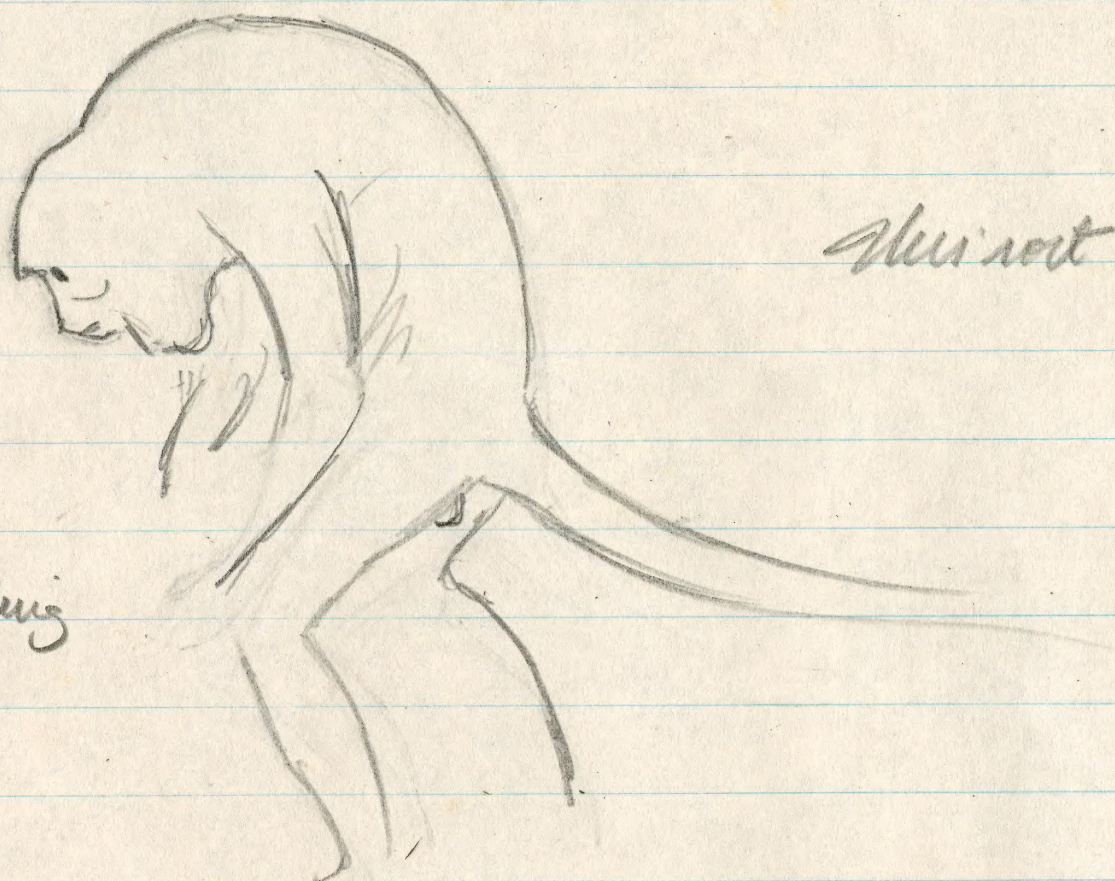
August 30, 1961

Barro Colorado

Regret to say that both Mike and The died a few days after the notes written above.

The day before yesterday, I let Bully out of his cage and let him run loose. Then I greeted at him in my usual way. Worked him

up into a rage. Beude himself with fury. Lots of running about. Redirection sitting on any piece of wood or other objects available. Some B (unusual rest). And also lots and lots of extreme Arch posturing. Much more extreme than any Arches of Night Monkeys I have seen. Sometimes done while he stood on his hind legs (preparatory to leaping)



This sort of thing

Arms dangling

As far as I can remember, all or most of these arches were quite silent.

